CLAIMS

Claims 1-48 (Cancelled)

49. (Previously presented) A space engine comprising a gas heating device, wherein said gas heating device includes:

at least one chamber for containing gas, delimited by a wall having a front face coated with fissile material and a rear face, and

means for cooling the rear face of the wall of said chamber,

wherein the fissile material on the front face of the chamber wall is in direct contact-with gas circulating through said chamber, the space engine further comprising means for expelling the heated gas from the chamber into space to generate thrust.

50. (Original) A space engine according to claim 49, wherein the heated gas comprises hydrogen.

51. (Withdrawn) A space engine according to claim 49, wherein the heated gas comprises at least one component selected from the group consisting of carbon dioxide, helium and argon.

52. (Previously presented) A space engine according to claim 49, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

53. (Previously presented) A space engine according to claim 49, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2.

54. (Original) A space engine according to claim 49, wherein the fissile material comprises ^{242m}Am as a fissile isotope.

55. (Original) A space engine according to claim 54, wherein the fissile material is in the form of a carbide.

56. (Withdrawn) A space engine according to claim 49, wherein the fissile material comprises ^{233}U, ^{235}U or ^{239}Pu as a fissile isotope.

57. (Withdrawn) A space engine according to claim 56, wherein the fissile material is in the form of a carbide.

58. (Original) A space engine according to claim 49, further comprising a neutron reflector surrounding an enclosure in which said at least one chamber is located.

59. (Original) A space engine according to claim 58, wherein the neutron reflector comprises carbon, beryllium or beryllium oxide.

60. (Original) A space engine according to claim 58, wherein the neutron reflector comprises a thickness of carbon material surrounding the enclosure, said thickness, in cm, I being at least 50/d, where d is the density of said carbon material expressed in g/cm^3.

61. (Original) A space engine according to claim 58, wherein the neutron reflector has cavities for receiving removable neutron-absorbing control rods.

62. (Original) A space engine according to claim 58, wherein a plurality of chambers are arranged in the enclosure surrounded by the neutron reflector for receiving the heated gas.

63. (Original) A space engine according to claim 58, wherein the means for expelling the heated gas comprise an exhaust nozzle, and said at least one chamber is in communication with said exhaust nozzle through a throat provided in the neutron reflector.

64. (Currently amended) A space engine according to claim 63, wherein the enclosure has a fuel region where <u>said at least one chamber is located, and a hot gas collecting region</u>

between the fuel region and the throat, wherein a cooling medium is circulated in a circuit having a first portion on a face of the neutron reflector adjacent to the hot gas collect-region and a second portion located in the fuel region and separated from the hot gas collecting region by a partition having an aperture in which an open end of the coated chamber wall is inserted, and wherein the coated chamber wall separates the chamber from said second portion of the cooling circuit inside the fuel region.

65. (Previously presented) A space engine according to claim 64, wherein a molten metal is used as said cooling medium.

66. (Original) A space engine according to claim 65, wherein said molten metal comprises ^{7}Li.

67. (Original) A space engine according to claim 49, wherein said at least one chamber has a tubular shape.

68. (Original) A space engine according to claim 49, wherein the wall of said at least one chamber is made of a porous material, and further comprising means for introducing the gas into the chamber through pores of the porous wall material.

69. (Original) A space engine according to claim 68, wherein said porous material is a carbon material.

70. (Previously amended) A space engine according to claim 68, wherein a gas-tight layer is coated on the rear face of the chamber wall, to direct the gas introduced through the pores of the porous wall material towards the inside of the chamber.

71. (Cancelled)

72. (Previously presented) A space engine according to claim 49, wherein the means for cooling the chamber wall include a molten metal used as a cooling medium.

73. (Original) A space engine according to claim 72, wherein said molten metal comprises ^{7}Li.

74. (Previously presented) A gas heating device, comprising:

at least one open chamber having a wall, said wall having a front face coated with fissile material comprising ^{242m}Am as a fissile isotope, and a rear face;

inlet means for introducing gas into the chamber;

outlet means for evacuating gas circulated through said chamber from the inlet means; and

means for cooling the rear face of the wall of said chamber,

wherein the fissile material on the front face of the chamber wall is in direct contact with the gas circulating through said chamber.

75. (Previously presented) A device according to claim 74, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

76. (Previously presented) A device according to claim 74, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2.

77. (Previously presented) A device according to claim 74, wherein the fissile material is in the form of a carbide.

78. (Previously presented) A device according to claim 74, wherein said at least one chamber has a tubular shape.

79. (Previously presented) A device according to claim 74, wherein said inlet means comprise a porous material of which the wall of said at least one chamber is made, the gas being introduced into the chamber through pores of the porous wall material.

80. (Previously presented) A device according to claim 79, wherein said porous material is a carbon material.

81. (Previously presented) A device according to claim 79, wherein said inlet means further comprise a gas-tight layer coated on the rear face of the chamber wall, to direct the gas introduced through the pores of the porous wall material towards the inside of the chamber.

82. (Previously presented) A device according to claim 74, wherein the means for cooling the chamber wall include a molten metal used as a cooling medium.

83. (Previously presented) A device according to claim 74, wherein said molten metal comprises ^{7}Li.

84. (Previously presented) A gas heating device, comprising:

at least one open chamber having a wall, said wall having a front face coated with fissile material and a rear face;

inlet means for introducing gas into the chamber, comprising a porous material of which the wall of said at least one chamber is made, the gas being introduced into the chamber through pores of the porous wall material;

outlet means for evacuating gas circulated through said chamber from the inlet means; and

means for cooling the rear face of the wall of said chamber,

wherein the fissile material on the front face of the chamber wall is in direct contact with the gas circulating through said chamber.

85. (Previously presented) A device according to claim 84, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

86. (Previously presented) A device according to claim 84, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2.

87. (Previously presented) A device according to claim 84, wherein said porous material is a carbon material.

88. (Previously presented) A device according to claim 84, wherein said inlet means further comprise a gas-tight layer coated on the rear face of the chamber wall, to direct the gas introduced through the pores of the porous wall material towards the inside of the chamber.

89. (Previously presented) A device according to claim 84, wherein the means for cooling the chamber wall include a molten metal used as a cooling medium.

90. (Previously presented) A device according to claim 89, wherein said molten metal comprises ^{7}Li.

91. (Previously presented) A gas heating device, comprising:

at least one open chamber having a wall, said wall having a front face coated with fissile material and a rear face;

inlet means for introducing gas into the chamber;

outlet means for evacuating gas circulated through said chamber from the inlet means; and

means for cooling the rear face of the wall of said chamber, including a molten metal used as a cooling medium,

wherein the fissile material on the front face of the chamber wall is in direct contact with the gas circulating through said chamber.

92. (Previously presented) A device according to claim 90, wherein said molten metal comprises ^{7}Li.

93. (Previously presented) A device according to claim 91, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

94. (Previously presented) A device according to claim 91, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2.

95. (Previously presented) A device according to claim 94, wherein the fissile material coating has a fissile content in the range from 1 to 3 mg/cm^2.

96. (Cancelled)

97. (Currently amended) A ~~device~~ space engine according to claim 53, wherein the fissile material coating has a fissile content in the range from 1 to 3 mg/cm^2.

98. (Previously presented) A device according to claim 76, wherein the fissile material coating has a fissile content in the range from 1 to 3 mg/cm^2.

99. (Previously presented) A device according to claim 86, wherein the fissile material coating has a fissile content in the range from 1 to 3 mg/cm^2.

100. (New) A device according to claim 74, further comprising a neutron reflector surrounding an enclosure in which said at least one chamber is located.

101. (New) A device according to claim 100, wherein the neutron reflector comprises carbon, beryllium or beryllium oxide.

102. (New) A device according to claim 100, wherein the neutron reflector comprises a thickness of carbon material surrounding the enclosure, said thickness, in cm, being at least 50/d, where d is the density of said carbon material expressed in g/cm^3.

103. (New) A device according to claim 100, wherein the neutron reflector has cavities for receiving removable neutron-absorbing control rods.

104. (New) A device according to claim 100, wherein a plurality of chambers are arranged in the enclosure surrounded by the neutron reflector for receiving the heated gas.

105. (New) A device according to claim 100, wherein said outlet means are in communication with an exhaust nozzle through a throat provided in the neutron reflector.

106. (New) A device according to claim 105, wherein the enclosure has a fuel region where said at least one chamber is located, and a hot gas collecting region between the fuel region and the throat, wherein a cooling medium is circulated in a circuit having a first portion on a face of the neutron reflector adjacent to the hot gas collecting region and a second portion located in the fuel region and separated from the hot gas collecting region by a partition having an aperture in which an open end of the coated chamber wall is inserted, and wherein the coated chamber wall separates the chamber from said second portion of the cooling circuit inside the fuel region.

107. (New) A device according to claim 106, wherein a molten metal is used as said cooling medium.

108. (New) A device according to claim 107, wherein said molten metal comprises ^{7}Li.

109. (New) A device according to claim 84, further comprising a neutron reflector surrounding an enclosure in which said at least one chamber is located.

110. (New) A device according to claim 109, wherein the neutron reflector comprises carbon, beryllium or beryllium oxide.

111. (New) A device according to claim 109, wherein the neutron reflector comprises a thickness of carbon material surrounding the enclosure, said thickness, in cm, being at least 50/d, where d is the density of said carbon material expressed in g/cm^3.

112. (New) A device according to claim 109, wherein the neutron reflector has cavities for receiving removable neutron-absorbing control rods.

113. (New) A device according to claim 109, wherein a plurality of chambers are arranged in the enclosure surrounded by the neutron reflector for receiving the heated gas.

114. (New) A device according to claim 109, wherein said outlet means are in communication with an exhaust nozzle through a throat provided in the neutron reflector.

115. (New) A device according to claim 105, wherein the enclosure has a fuel region where said at least one chamber is located, and a hot gas collecting region between the fuel region and the throat, wherein the means for cooling comprise a cooling medium circulated in a circuit having a first portion on a face of the neutron reflector adjacent to the hot gas collecting region and a second portion located in the fuel region and separated from the hot gas collecting region by a partition having an aperture in which an open end of the coated chamber wall is inserted, and wherein the coated chamber wall separates the chamber from said second portion of the cooling circuit inside the fuel region.

116. (New) A device according to claim 91, further comprising a neutron reflector surrounding an enclosure in which said at least one chamber is located.

117. (New) A device according to claim 116, wherein the neutron reflector comprises carbon, beryllium or beryllium oxide.

118. (New) A device according to claim 116, wherein the neutron reflector comprises a thickness of carbon material surrounding the enclosure, said thickness, in cm, being at least 50/d, where d is the density of said carbon material expressed in g/cm^3.

119. (New) A device according to claim 116, wherein the neutron reflector has cavities for receiving removable neutron-absorbing control rods.

120. (New) A device according to claim 116, wherein a plurality of chambers are arranged in the enclosure surrounded by the neutron reflector for receiving the heated gas.

121. (New) A device according to claim 116, wherein said outlet means are in communication with an exhaust nozzle through a throat provided in the neutron reflector.

122. (New) A device according to claim 121, wherein the enclosure has a fuel region where said at least one chamber is located, and a hot gas collecting region between the fuel region and the throat, wherein the means for cooling comprise a cooling medium circulated in a circuit having a first portion on a face of the neutron reflector adjacent to the hot gas collecting region and a second portion located in the fuel region and separated from the hot gas collecting region by a partition having an aperture in which an open end of the coated chamber wall is inserted, and wherein the coated chamber wall separates the chamber from said second portion of the cooling circuit inside the fuel region.